

**Summary of Qualifications
Francis I. Chung. Ph.D., P.E.**

POSITION: Supervising Engineer, Water Resources

EDUCATION: M.S. Civil Engineering, University of California, Davis, 1979
Ph.D. Civil Engineering, University of California, Davis 1982

CURRENT ASSIGNMENT:

Chief, the Delta Modeling Section, California Department of Water Resources. Responsible for the development and application of hydrodynamics and water quality models as applied to the San Francisco-Sacramento Bay-Delta.

EXPERIENCE:

Flood Modeling in Estuary - Directed the work with DWOPER/NETWORK models developed by Dr. Danny Fread of National Weather Service. The models are used to simulate the flood routing within the Northern part of the Sacramento-San Joaquin Delta.

Reservoir Simulation Model Development - Developed, enhanced and maintained a generalized computer program that can simulate the operation of the State Water Project and Central Valley Project. The model is known as DWRSIM and used widely for various planning purposes.

California Aqueduct Simulation via Linear Programming - Incorporated linear programming techniques developed by Texas Water Development Board for the simulated operation of the California Aqueduct System.

Kern County Surface/Subsurface Conjunctive Use Model - Developed a mathematical model that can simulate the operation of the local surface and subsurface water system within the Kern County so that the incremental effect of the Kern Water Bank Project can be readily evaluated under varying scenarios.

Risk Assessment of the State Water Project (SWP) Operational Criteria - As one of the principal investigators of this project, generated 17,100 years multi-site stochastic inflows for the entire Sacramento Valley hydrology including inflows to Lake Shasta, Lake Oroville, Lake Folsom, Clair Engle Lake and local Inflows coming

out of various depletion areas. Then the resulting data was screened and supplied to a computer model that simulates the operation of the CVP and the SWP.

Two-Dimensional Modeling of Ground water Flow and Quality - Vertical section of a ground water flow was modeled using Finite Element Method. Radioactive decay terms were investigated as part of non-conservative solute transport process.

PUBLICATIONS:

Barnes, George and Ilwhan Chung, "Simulation for California Water System", American Society of Civil Engineers Annual Convention, San Francisco, California, October 1984.

Chung, Francis I. and Robert Zettlemoyer, "Successive Application of Reservoir Simulation Model -- A Case Study", Computer Applications in Water Resources, American Society of Civil Engineers National Specialty Conference, Buffalo, New York. June 1985.

Chung, Ilwhan and Otto Helweg, Modeling the California State Water Project", Journal of the Water Resources Planning and Management Division, American Society of Civil Engineers, Vol. III, No. I, Pages 82-97, January 1985.

Barnes, George and Francis I. Chung, "Operational Planning for California Water System", Journal of the Water Resources Planning and Management Division, American Society of Civil Engineers, Vol.112, No.1, Pages 71-86, January 1986.

Chung, Francis I. and Michael C. Archer, "Reservoir System Simulation Through Network Flow Programming", Water Forum 1996. Proceedings of the Conference, American Society of Civil Engineers, Long Beach, California, Pages 1335-1342, August 4-6, 1986.

Helweg, Otto, Mahabir Prasad, and Francis I. Chung, "Optimal Management of California Conjunctive Use Facilities", Water Resources Bulletin, Submitted for publication.

Chung, Francis I., Michael C. Archer, and Johannes J. DeVeries, "Network Flow Algorithm Applied to California Aqueduct Simulation", Journal of the Water Resources Planning and Management Division, American Society of Civil Engineers, Vol. 115, No.2, Pages 131-147, March 1989.

Chung, Francis I., Sushil K. Arora, and Michael C. Archer, "Stochastic Evaluation of Reservoir Operation Rules", 3rd Water Resources Operations and Management

Workshop, Proceedings of the 3rd Water Resources operations Management Workshop, Water Resources Planning and Management Division, American Society of Civil Engineers, Pages 131-143. June 27-30, 1988, Fort Collins, Colorado.

Robert H. Zettlemyer, John Clementis, and Francis I. Chung, "Tradeoffs Between Firm Supply and Average Supply", Specialty Conference, American Society of Civil Engineers, Proceedings of the 16th Annual Conference, Pages 1-4, May 21 -25, 1989, Sacramento, California.

Sina Darabzand, Francis I. Chung, and suahil Arora, "Conjunctive Operation of Surface and Subsurface Storages in California - Macroscopic Planning", Specialty Conference, American Society of Civil Engineers, Proceedings of the 16th Annual Conference, Pages 156-159, May 21-25, 1989, Sacramento, California.

Elizabeth S. Andrews, Francis I. Chung. and Jay R. Lund, "Conjunctive Operation of Surface and Subsurface Storages in California: Regional Planning in Kern County", Specialty Conference, American Society of Civil Engineers, Proceedings of the 16th Annual Conference, Pages 160-163, May 21-25,1989, Sacramento, California.

Francis I. Chung, and Lisa Roig, "Uses of Mathematical Model for the Sacramento/San Joaquin Delta", Specialty Conference. American Society of Civil Engineers, Water Resources Planning and Management, Proceedings of the 16th Annual Conference, Pages 164-167, May 21-25,1989, Sacramento, California.

Elizabeth S. Andrews, Francis I. Chung, and Jay R. Lund, "Priority-Based Multi-Layered Simulation of Conjunctive Facilities", Journal of the Water Resources Planning and Management Division, American Society of Civil Engineers, Vol.118, No.1, January 1992.

Paul H. Hutton, and Francis I. Chung, "Trihalomethane Formation Potential in the Sacramento-San Joaquin Delta -- Model Formulation", Journal of the Water Resources and Management Division, American Society of Civil Engineers, September 1992.

Paul H. Hutton, and Francis I. Chung, "Trihalomethane Formation Potential in the Sacramento-San Joaquin Delta -- Model Application", Journal of the Water Resources and Management Division, American Society of Civil Engineers, September 1992.